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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/782,972	02/23/2004	Shiro Suyama	32307-201091	7722
26694	7590	08/11/2006	EXAMINER	
VENABLE LLP P.O. BOX 34385 WASHINGTON, DC 20045-9998			SHENG, TOM V	
			ART UNIT	PAPER NUMBER
			2629	

DATE MAILED: 08/11/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/782,972	SUYAMA ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	
	Tom V. Sheng	2629	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 5/23/2006.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 23-31 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 23-31 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                        | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)    | Paper No(s)/Mail Date. _____  |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                                    |

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 112***

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. Claims 23-31 are rejected under 35 U.S.C. 112, first paragraph, as based on a disclosure which is not enabling. Regarding claim 23, the inventive feature regarding the effect of the frequency of an AC voltage on a liquid crystal layer's dielectric constant anisotropy, critical or essential to the practice of the invention, but not included in the claim(s) is not enabled by the disclosure. See *In re Mayhew*, 527 F.2d 1229, 188 USPQ 356 (CCPA 1976).

Referring to fig. 7 and lines 9-20 of page 23 of the Specification, the Applicant discloses the driving frequency dependency of the dielectric constant anisotropy of the dual-frequency liquid crystal. Specifically, at a low frequency range, the dielectric constant anisotropy is  $> 0$ , with the longer axes of the molecules of the liquid crystal being aligned along the electric field, and at a high frequency range, the dielectric constant anisotropy is  $< 0$ , with the longer axes of the molecules of the liquid crystal being aligned perpendicularly to the electric field. Accordingly, the refractive index of the liquid crystal is varied with the varying of the driving frequency.

Referring to fig. 13 and lines 1-22 of page 28 of the Specification, the Applicant discloses an optical device with a variable refractive index material 22. Specifically, the

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Applicant teaches that at frequency  $f_{11}$  the molecules of material 22 are aligned in parallel to the direction of the electric field and at frequency  $f_{12}$  the molecules of material 22 are aligned perpendicular to the electric field. It is clear from the above teachings that the driving frequency, not the driving amplitude, determines the alignment of the liquid crystal molecules and thus the dielectric constant anisotropy and subsequently the refractive index.

Referring to fig. 21-23 and line 22 of page 36 to line 2 of page 38 of the Specification, the Applicant discloses the driving of two frequencies simultaneously across a variable refractive index material 81. Specifically, the Applicant teaches driving at frequency  $f_{31}$  for aligning the longer axis along the electric field and at frequency  $f_{32}$  for aligning the longer axis perpendicular to the electric field. Moreover, the voltage ratio (i.e. the ratio of the amplitudes of  $f_{31}$  to  $f_{32}$ ) determines the refractive index. Further, the larger the amplitudes used, the faster a refractive index is reached. Here, the primary effect of driving frequencies in determining a refractive index is also disclosed.

Applicant's amendment of "wherein longer axes of the molecules of the variable refractive index material are aligned along the electric field when applying a larger amplitude of the AC voltage according to the positive dielectric constant anisotropy, and the longer axes of the molecules of the variable refractive index material are aligned perpendicularly to the electric field when applying a smaller amplitude of the AC voltage according to the negative dielectric constant anisotropy" in claim 23 does not disclose how driving frequencies are utilized in order to effect changes in the variable refractive

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index. This critical aspect of controlling the variable refractive index through driving frequencies, not included in the claim, fails to enable the claim. Claims 24-31 are dependent on claim 23.

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 23-31 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

As for claim 23, it is unclear as to the meaning and scope of "wherein longer axes of the molecules of the variable refractive index material are aligned along the electric field when applying a larger amplitude of the AC voltage according to the positive dielectric constant anisotropy, and the longer axes of the molecules of the variable refractive index material are aligned perpendicularly to the electric field when applying a smaller amplitude of the AC voltage according to the negative dielectric constant anisotropy." Specifically, how could a larger amplitude of the AC voltage be able to align the molecules along the electric field while a smaller amplitude of the same AC voltage be then able to align the molecules perpendicularly to the electric field. Clarification of the claim is requested. Claims 24-31 are dependent on claim 23.

### ***Response to Arguments***

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5. Applicant's arguments with respect to claims 23-31 have been considered but are moot in view of the new ground(s) of rejection.

### ***Conclusion***

6. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tom V. Sheng whose telephone number is (571) 272-7684. The examiner can normally be reached on 9:00am - 6:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amr Awad can be reached on (571) 272-7764. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Tom Sheng  
July 31, 2006

AMR A. AWAD  
PRIMARY EXAMINER  
